

J. Osborn



# ecology and environment, inc.

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International Specialists in the Environment

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## MEMORANDUM

DATE: February 10, 1988

TO: John Osborn, FIT-RPO, USEPA, Region X

FOR: Joyce Crosson, RSCC, USEPA, Region X

THRU: <sup>fit</sup> David Buecker, FIT-OM, E&E, Seattle ~~TNT~~

FROM: James Herndon, Chemist, E&E, Seattle

Andrew Hafferty, Senior Chemist, E&E, Seattle *998*

SUBJ: QA of Case 8383 (Inorganics)  
Monsanto Chemical

TDD: F10-8702-06

CC: Raleigh Farlow, ESD-DPO, USEPA, Region X

Gerald Muth, DPO, USEPA, Region X Laboratory, Manchester

John Tilstra, DPO, USEPA, Region IX

John Osborn, ESD-PO, USEPA, Region X

Deborah Flood, HWD-SM, USEPA, Region X

Jeffrey Whidden, E&E, Seattle

The Quality Assurance review of 31 samples, Case 8383, collected from Monsanto Chemical, has been completed. The 31 water samples were analyzed at Low level for TCL INORGANICS by Rocky Mountain Analytical of Arvada, Colorado.

The samples were received in two packets and were numbered by packet as follows:

### Data Packet #1

### Data Packet #2

MJB-539	MJB-550
MJB-540	MJB-551
MJB-541	MJB-552
MJB-542	MJB-553
MJB-544	MJB-554
MJB-545	MJB-555
MJB-546	MJB-556
MJB-547	MJB-557
MJB-548	MJB-558
MJB-549	

MJB-543	MJB-564
MJB-559	MJB-567
MJB-560	MJB-568
MJB-561	MJB-580
MJB-562	MJB-581
MJB-563	MJB-582

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Data Qualifications

The following comments refer to the laboratory performance in meeting the Quality Control specifications outlined in IFB WA87-K025, IFB WA87-K026 and IFB WA87-K027.

1) Timeliness - Acceptable

Sample Number	Sample Date	Recd. Date	ICP Prep.	ICP Anal.	AA Prep.	AA Anal.	HG. Anal.
MJB-539	11/03	11/06	11/23	12/07	11/23	12/06	12/01
MJB-540	11/03	11/06	11/23	12/07	11/23	12/06	12/01
MJB-541	11/03	11/06	11/23	12/07	11/23	12/06	12/01
MJB-542	11/03	11/06	11/23	12/07	11/23	12/06	12/01
MJB-543	11/03	11/06	11/23	12/08	11/23	12/08	12/01
MJB-544	11/03	11/06	11/23	12/07	11/23	12/06	12/01
MJB-545	11/03	11/06	11/23	12/07	11/23	12/06	12/01
MJB-546	11/03	11/06	11/23	12/08	11/23	12/06	12/01
MJB-547	11/03	11/06	11/23	12/08	11/23	12/06	12/01
MJB-548	11/03	11/06	11/23	12/08	11/23	12/06	12/01
MJB-549	11/03	11/06	11/23	12/08	11/23	12/06	12/01
MJB-550	11/03	11/06	11/23	12/08	11/23	12/06	12/01
MJB-551	11/03	11/06	11/23	12/08	11/23	12/06	12/01
MJB-552	11/03	11/06	11/23	12/08	11/23	12/06	12/01
MJB-553	11/03	11/06	11/23	12/08	11/23	12/06	12/01
MJB-554	11/03	11/06	11/23	12/08	11/23	12/06	12/01
MJB-555	11/03	11/06	11/23	12/08	11/23	12/06	12/01
MJB-556	11/03	11/06	11/23	12/08	11/23	12/06	12/01
MJB-557	11/03	11/06	11/23	12/08	11/23	12/06	12/01
MJB-558	11/03	11/06	11/23	12/08	11/23	12/06	12/01
MJB-559	11/03	11/06	11/23	12/08	11/23	12/08	12/01
MJB-560	11/03	11/06	11/23	12/08	11/23	12/08	12/01
MJB-561	11/04	11/06	11/23	12/08	11/23	12/08	12/01
MJB-562	11/04	11/06	11/23	12/08	11/23	12/08	12/01
MJB-563	11/03	11/06	11/23	12/08	11/23	12/08	12/01
MJB-564	11/03	11/06	11/23	12/08	11/23	12/08	12/01
MJB-567	11/04	11/06	11/23	12/08	11/23	12/08	12/01
MJB-568	11/04	11/06	11/23	12/08	11/23	12/08	12/01
MJB-580	11/03	11/06	11/23	12/08	11/23	12/08	12/01
MJB-581	11/03	11/06	11/23	12/08	11/23	12/08	12/01
MJB-582	11/04	11/06	11/23	12/08	11/23	12/08	12/01

2) Initial Calibration - Acceptable

All ICP and Graphite Furnace standards met the requirements for frequency and percent recovery for all metals.

Forms for the Calibrations were separated by ICP and Furnace/ Cold Vapor results instead of compiling the data into a complete summary form series.

3) Continuing Calibration - Acceptable

All ICP and Graphite Furnace continuing standards met the requirements for frequency and percent recovery for all metals.

The first continuing calibration data as listed on the form are not the actual first continuing calibration results. The results listed come from the initial multi-point calibration standard number 3 from earlier in the day. The second continuing calibration column on the form is the data that should have been the first continuing calibration .

Forms for the Calibrations were separated by ICP and Furnace/ Cold Vapor results instead of compiling the data into a complete summary form series.

4) Instrument Detection Limits - Acceptable

Instrument Detection Limits (IDL) were equal to or below the Contract Required Detection Limits (CRDL) for all metals.

5) Blanks - Acceptable

All ICP and Graphite Furnace Initial Calibration, Continuing Calibration and Preparation Blanks met the requirements for frequency. Background levels of elements were below the Instrument Detection Limits.

Forms for the blanks were separated by ICP and Furnace/ Cold Vapor results instead of compiling the data into a complete summary form series.

Negative values were entered for the Lead analysis on the Continuing Calibration Blank. The negative values were incorrectly flagged "B" (value between Contract Required Detection Limit and Instrument Detection Limit) by the laboratory.

6) ICP Interference Check - Acceptable

The Interference Check Sample (ICS) elements met the contract required limits for recovery on the analysis of A and A+B ICS on 12/8/87 run at 1:44 & 2:02 (packet 1).

The ICS elements listed in the form for the analysis of the initial A and A+B ICS on 12/8/87 run at 15:30 and 15:36 (packet 2) are not correctly transferred to the form. The raw data does not match the values on the form. Recoveries calculated from raw data for the A and A+B ICS are within the contract required limits.

The final A and A+B ICS for the date above were incorrectly entered on the form. Values entered for ICS A results were from a previous sample analysis, not the final ICS. The raw data could not be found in the packet (packet 2).

7) Laboratory Control Sample - Acceptable

All elements in the Laboratory Control sample had recoveries within the contract limits calculated for waters.

Forms for the Laboratory Control Sample were separated by ICP and Furnace/ Cold Vapor results instead of compiling the data into a single complete summary form.

8) Duplicate Sample Analysis - Acceptable

The duplicate values for Selenium in sample MJB-543 (packet 2) and Lead in sample MJB-544 (packet 1) did not meet the calculated contract required limits for duplicates.

Sample	Matrix	Element	Duplicate Value	QC Limit
MJB-543	Water	Selenium	20U	4.7 - 14.7
MJB-544	Water	Lead	5.3	0 - 5

QC Limit = +/- CRDL if sample is less than 5 times CRDL

All Lead results in packet 1 were flagged "J" (estimated). All Selenium results in packet 2 were flagged "J" (estimated).

9) Spiked Sample Analysis - Acceptable

The ratio of sample to spike result must be less than or equal to 4 to be considered for QC limits. The recovery values for Selenium in sample MJB-540 (packet 1) and Thallium in sample MJB-560 (packet 2) were outside of the contract required quality control limits. The spiked sample results were less than the sample results giving a negative recovery value.

Sample	Matrix	Element	%R	QC Limits	Ratio
MJB-540	Water	Selenium	-140	75 - 125 %	1.4
MJB-560	Water	Thallium	-61.8	75 - 125 %	0.86

%R = Percent Recovery

Ratio = Sample Value/Spike Value

All selenium results in packet 1 were flagged "J" (estimated) and detection limits flagged "R" (unusable). All Thallium results in packet 2 were flagged "J" (estimated) and detection limits flagged "R" (unusable).

10) ICP Serial Dilution - Acceptable

The ICP serial dilution analyses had Percent Differences (%D) less than 10% for the elements having concentrations greater than 10 times the Instrument Detection Limit.

11) Furnace AA - Acceptable

The sequence for sample and Analytical Spike analysis was within contract requirements for Relative Percent Difference of duplicate analytical runs. The Analytical Spikes were made at twice the Contract Required Detection Limit.

Spike recovery

Samples with Analytical Spike recoveries of less than 40% were diluted and rerun. Samples with recoveries outside of the contract required Analytical Spike recovery limits that had a sample value greater than 50% of the spike value were run by the Method of Standard Addition (MSA).

Method of Standard Addition (MSA) Analysis

Analyses with Correlation Coefficients (r) less than 0.995 were reanalyzed and recalculated.

The calculated Correlation Factor (r) for Arsenic in sample MJB-540S (spike) (packet 1) was given as 0.0000 and the final concentration value was given as 0.0 on the MSA form. The factor calculated from the data on the form was 0.997 and the final concentration calculated from these values was 52.1 ug/L. The final concentration value on the Spiked Sample summary form (41.3 ug/L) does not agree with this value. A second Arsenic MSA analysis not listed on the form was found in the raw data. The value calculated from that MSA was the one used in the Spiked Sample form. No explanation for the rejection of the data on the MSA form was provided.

The report forms for MSA list Correlation Factor (r) results to the fourth decimal place. The results are actually rounded to the third decimal place.

The following MSA analyses did not generate a Correlation Coefficient of 0.995 or more on the initial or repeat analysis.

Sample	Element	r
MJB-552	Arsenic	0.991
MJB-552R	Arsenic	0.994

r = Correlation Coefficient

The Arsenic results for sample MJB-552 were flagged "J" (estimated quantity).

12) Mercury Analysis - Acceptable

Mercury analyses met all contract requirements for frequency of quality control and analytical sequence.

13) Cyanide Analysis - Acceptable

Cyanide analysis was not requested for this sample set.

14) Sample Analysis -

The results for the following samples and elements were flagged "F" (exceeds drinking water limits):

Sample Number	All results in ug/L (Water Quality Limits)							
	As (50)	Cd (10)	Cr (50)	Fe (300)	Pb (50)	Se (10)	Mn (50)	Zn (5000)
MJB-539	--	88	--	--	--	19	--	--
MJB-540	--	90	--	--	--	14	--	--
MJB-547	--	--	--	--	--	--	1320	--
MJB-548	--	--	--	--	--	--	1330	--
MJB-549	--	57	--	--	--	550	--	--
MJB-550	--	57	--	--	--	686	--	--
MJB-551	--	41	--	--	--	189	1330	--
MJB-552	--	36	--	--	--	161	1300	--
MJB-553	--	781	--	1130	--	291	2180	6160
MJB-554	--	782	--	797	--	181	2170	6130
MJB-555	--	--	--	23700	--	--	324	--
MJB-557	--	10	--	--	--	775	--	--
MJB-558	--	--	--	--	--	890	--	--
MJB-559	--	5520	--	--	--*	359	1260	10200
MJB-560	--	5220	--	--	--	375	1220	9430

Sample Number	All results in ug/L (Water Quality Limits)							
	As (50)	Cd (10)	Cr (50)	Fe (300)	Pb (50)	Se (10)	Mn (50)	Zn (5000)
MJB-562	--	11	--	--	--	--	--	--
MJB-563	--	--	--	--	--	91	--	--
MJB-564	--	15	--	--	--	77	--	--
MJB-567	--	49	--	1060	--	--	--	--
MJB-568	147	168000	192	3520	77	5270	9240	354000
MJB-580	--	10	--	--	--	--	--	--
MJB-582	--	32	--	--	--	17	--	--

As - Arsenic

Fe - Iron

Mn - Manganese

Cd - Cadmium

Pb - Lead

Zn - Zinc

Cr - Chromium

Se - Selenium

-- = Results below water quality limits

\* = see explanation of result below

\* - The result for Lead was not on the sample report form for sample MJB-559. The analysis was done and the value should be 1.0U ug/L.

#### Laboratory Contact

The laboratory was contacted on January 7, 1988 concerning irregularities in the forms. The Laboratory Contact form is attached. The laboratory contact said the problems stemmed from bugs in a new computer form generating program. The resubmitted forms corrected some of the problems but also created new ones. A second submittal was not requested.

#### Data Use

The usefulness of the data is based on the criteria outlined in the "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" (R-582-5-5-01).

Upon consideration of the above comments, the data is ACCEPTABLE for use except where flagged with data qualifiers which modify the usefulness of individual values.

This QA memorandum completes the series of QA reviews of CLP lab data for samples collected during the Site Inspection identified on the cover page under the heading SUBJ::.

Data Qualifiers

- U - The material was analyzed for, but was not detected. The associated numerical value is an estimated sample quantitation limit.
- J - The associated numerical value is an estimated quantity because quality control criteria were not met or concentrations reported were less than the CRQL.
- R - Quality Control indicates that data are unusable (compound may or may not be present). Resampling and reanalysis are necessary for verification.
- Q - No analytical result.
- N - Presumptive evidence of presence of material (tentative identification).
- B - The compound was found in the laboratory blank as well as the sample.
- M - Mass spectral criteria for positive identification were not met. However, in the opinion of the laboratory, the identification is correct based on the analyst's professional judgement.
- F - Concentration of this compound exceeds either the primary or secondary drinking water standard listed in the Safe Drinking Water Act of 1974.

870206.INO (for WP use only)

In Reference to Case No(s):  
8383

Contract Laboratory Program  
REGIONAL/LABORATORY COMMUNICATION SYSTEM

2 pkgs

Telephone Record Log

Date of Call:

7 January 88

Laboratory Name:

R MAL

Lab Contact:

Kathy Hutchinson

Region:

X

Regional Contact:

Andrew Hafferty

Call Initiated By:

Laboratory      X Region

In reference to data for the following sample number(s):

MJB 543

MJB -539-542

MJB 559-564

MJB 544 -558

MJB 567-568

MJB 580-582

Summary of Questions/Issues Discussed:

1. No preparation blank data supplied with blank form for AA metals
2. ICP interference check sample data not correct - wrong raw data used
3. Final ICS AB values not entered on form - raw data exists
4. No LCS values for AA elements reported
5. Control limits not listed on Form VI-IV, Duplicates

Summary of Resolution:

corrections to be forwarded

new computer system has caused problems



Signature

7 Jan 88  
Date

Distribution: (1)Lab Copy, (2)Region Copy, (3)SMO Copy

U.S. EPA - CLP

000002

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB543

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB543Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	28.2	1
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	4.0	U
7440-39-3	Barium	63.2	1
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	5.0	U
7440-70-2	Calcium	110000	U
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	31.0	U
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	49500	U
7439-96-5	Manganese	5.0	U
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	7.0	U
7440-09-7	Potassium	4800	U
7482-49-2	Selenium	9.7	1
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	22900	U
7440-28-0	Thallium	20.0	U
7440-62-2	Vanadium	38.1	1
7440-66-6	Zinc	13.3	1
	Cyanide	-	-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_Comments:  
SELENIUM VALUE DETERMINED BY MSAJEA  
2/4/88

## INORGANIC ANALYSIS DATA SHEET

1

MJB559Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB543Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Received: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	74.0	J
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	6.9	J
7440-39-3	Barium	46.0	J
7440-41-7	Beryllium	1.0	J
7440-43-9	Cadmium	5520	F
7440-70-2	Calcium	205000	-
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	7.7	J
7440-50-8	Copper	10.3	J
7439-89-6	Iron	31.0	U
7439-92-1	Lead	*	F
7439-95-4	Magnesium	100000	-
7439-96-5	Manganese	1260	F
7439-97-6	Mercury	0.5	-
7440-02-0	Nickel	125	-
7440-09-7	Potassium	88700	-
7482-49-2	Selenium	359	J
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	266000	-
7440-28-0	Thallium	2.0	U
7440-62-2	Vanadium	57.5	-
7440-66-6	Zinc	10200	F
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

## Comments:

SELENIUM VALUE DETERMINED BY MSA

FORM I - IN

7/87

JEA  
 \* see memo - Sample Analysis section  
 2/4/88

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U.S. EPA - CLP

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB560

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB543Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Received: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	49.8	3
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	5.4	J
7440-39-3	Barium	45.9	J
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	5220 F	-
7440-70-2	Calcium	197000	U
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	8.4	J
7440-50-8	Copper	10.3	J
7439-89-6	Iron	31.0	U
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	96400	U
7439-96-5	Manganese	1220 F	-
7439-97-6	Mercury	0.4	-
7440-02-0	Nickel	124	-
7440-09-7	Potassium	83200	-
7482-49-2	Selenium	375 F	J
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	256000	-
7440-28-0	Thallium	43.0	J
7440-62-2	Vanadium	55.6	-
7440-66-6	Zinc	9430 F	-
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

## Comments:

SELENIUM VALUE DETERMINED BY MSA  
THALLIUM VALUE REPORTED AT A 10X DILUTIONJES/JK  
2/4/88

U.S. EPA - CLP

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1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB561

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB543Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	21.8	J
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	4.0	U
7440-39-3	Barium	108	J
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	5.0	U
7440-70-2	Calcium	116000	U
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	31.1	J
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	61100	U
7439-96-5	Manganese	5.0	U
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	7.0	U
7440-09-7	Potassium	9960	U
7482-49-2	Selenium	20.0	U
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	14200	U
7440-28-0	Thallium	2.0	U
7440-62-2	Vanadium	4.7	J
7440-66-6	Zinc	16.9	J
	Cyanide	-	-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

## Comments:

SELENIUM VALUE REPORTED AT A 10X DILUTION

FORM I - IN

7/87

2/4/88  
JELF

000006

U.S. EPA - CLP

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB562Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB543Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	20.0	U
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	4.0	U
7440-39-3	Barium	105	U
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	10.6	F
7440-70-2	Calcium	114000	-
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	31.0	U
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	59900	U
7439-96-5	Manganese	5.2	U
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	7.0	U
7440-09-7	Potassium	9610	-
7482-49-2	Selenium	20.0	U
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	14300	U
7440-28-0	Thallium	2.0	U
7440-62-2	Vanadium	5.2	U
7440-66-6	Zinc	47.7	-
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

## Comments:

SELENIUM VALUE REPORTED AT A 10X DILUTION

FORM I - IN

7/87

JEN  
2/4/88

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB563Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB543Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	20.9	J
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	4.0	U
7440-39-3	Barium	65.8	J
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	9.1	-
7440-70-2	Calcium	92500	-
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	31.0	U
7439-92-1	Lead	1.4	J
7439-95-4	Magnesium	69300	-
7439-96-5	Manganese	5.0	U
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	9.4	E
7440-09-7	Potassium	11400	J
7482-49-2	Selenium	90.5	F
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	38400	-
7440-28-0	Thallium	20.0	U
7440-62-2	Vanadium	23.4	J
7440-66-6	Zinc	122	-
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

## Comments:

SELENIUM VALUE DETERMINED BY MSA  
THALLIUM VALUE REPORTED AT A 10X DILUTIONJEM  
2/4/88

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB564Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB543Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Received: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	22.4	J
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	4.0	J
7440-39-3	Barium	67.2	J
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	14.9	F
7440-70-2	Calcium	92100	—
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	31.0	U
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	68700	J
7439-96-5	Manganese	5.6	J
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	11.9	J
7440-09-7	Potassium	11000	—
7482-49-2	Selenium	77.4	F
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	38700	—
7440-28-0	Thallium	2.0	U
7440-62-2	Vanadium	26.8	J
7440-66-6	Zinc	144	—
	Cyanide		—

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

## Comments:

SELENIUM VALUE DETERMINED BY MSAJEA  
24/88

000009

U.S. EPA - CLP

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB567

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB543Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	560	-
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	40.0	U
7440-39-3	Barium	19.7	F
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	48.7 F	-
7440-70-2	Calcium	58500	-
7440-47-3	Chromium	35.1	-
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	1060 F	-
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	33200	-
7439-96-5	Manganese	30.0	-
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	13.7	F
7440-09-7	Potassium	265000	-
7482-49-2	Selenium	20.0	U
7440-22-4	Silver	13.1	-
7440-23-5	Sodium	118000	-
7440-28-0	Thallium	2.0	U
7440-62-2	Vanadium	28.9	F
7440-66-6	Zinc	1680	-
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

## Comments:

ARSENIC AND SELENIUM VALUES REPORTED AT A 10X DILUTIONA13  
2/4/88

000010

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB568Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB543Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	378	-
7440-36-0	Antimony	31.0	Ü
7440-38-2	Arsenic	147	F
7440-39-3	Barium	22.5	J
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	16800	F
7440-70-2	Calcium	77200	-
7440-47-3	Chromium	19.2	F
7440-48-4	Cobalt	12.2	J
7440-50-8	Copper	53.0	-
7439-89-6	Iron	352	F
7439-92-1	Lead	77.2	F
7439-95-4	Magnesium	16600	-
7439-96-5	Manganese	924	F
7439-97-6	Mercury	0.2	Ü
7440-02-0	Nickel	259	-
7440-09-7	Potassium	69500	-
7482-49-2	Selenium	5270	F
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	74900	-
7440-28-0	Thallium	4770	I
7440-62-2	Vanadium	590	-
7440-66-6	Zinc	35400	F
	Cyanide		-

Color Before: COLORLESS  
Color After: YELLOWClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

## Comments:

ARSENIC VALUE REPORTED AT A 10X DILUTION  
SELENIUM, THALLIUM AND LEAD VALUES DETERMINED BY MSAJEA  
2/4/88

000011

U.S. EPA - CLP

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB580Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB543Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	30.4	3
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	4.0	U
7440-39-3	Barium	3.0	U
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	10.3	F
7440-70-2	Calcium	168	S
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	31.0	U
7439-92-1	Lead	2.1	MA
7439-95-4	Magnesium	115	S
7439-96-5	Manganese	5.0	U
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	7.0	U
7440-09-7	Potassium	111	U
7482-49-2	Selenium	4.1	F
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	1500	U
7440-28-0	Thallium	2.0	U
7440-62-2	Vanadium	2.0	U
7440-66-6	Zinc	16.1	J
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

Comments:

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FORM I - IN

7/87

J/E/H  
2/4/88

1  
INORGANIC ANALYSIS DATA SHEETLab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476MJB581Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB543Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	20.0	U
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	4.0	U
7440-39-3	Barium	3.0	U
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	7.2	—
7440-70-2	Calcium	270	—
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	31.0	U
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	90.0	U
7439-96-5	Manganese	5.0	U
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	7.0	U
7440-09-7	Potassium	111	U
7482-49-2	Selenium	2.0	U
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	1500	U
7440-28-0	Thallium	2.0	U
7440-62-2	Vanadium	2.0	U
7440-66-6	Zinc	27.3	—
	Cyanide		—

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

Comments:

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JEA  
2/4/88

U.S. EPA - CLP

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1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB582

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB543Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	111	J
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	4.0	U
7440-39-3	Barium	68.7	J
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	32.3 F	-
7440-70-2	Calcium	116000	J
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	100	J
7439-92-1	Lead	1.9	J
7439-95-4	Magnesium	55800	J
7439-96-5	Manganese	5.0	U
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	7.0	U
7440-09-7	Potassium	6960	J
7482-49-2	Selenium	16.7 F	J
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	75400	J
7440-28-0	Thallium	2.0	U
7440-62-2	Vanadium	32.8	J
7440-66-6	Zinc	43.9	-
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

Comments:

SELENIUM VALUE DETERMINED BY MSA

FORM I - IN

7/87

JEA  
2/4/88

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB539Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB539Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	20.0	U
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	5.5	U
7440-39-3	Barium	76.6	U
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	87.6	U
7440-70-2	Calcium	114000	U
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	16.6	U
7439-89-6	Iron	31.0	U
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	61500	U
7439-96-5	Manganese	5.0	U
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	7.0	U
7440-09-7	Potassium	10400	U
7482-49-2	Selenium	19.0	U
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	51300	U
7440-28-0	Thallium	2.0	U
7440-62-2	Vanadium	9.6	U
7440-66-6	Zinc	112	U
	Cyanide		—
			—

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture:  
Artifacts: \_\_\_\_\_

Comments:

SELENIUM VALUES REPORTED AT A 10X DILUTIONJEM  
2/4/88

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U.S. EPA - CLP

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB540Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB539Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Received: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	26.1	F
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	5.8	F
7440-39-3	Barium	76.4	F
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	89.6	F
7440-70-2	Calcium	113000	-
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	30.8	U
7439-89-6	Iron	31.0	U
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	60800	-
7439-96-5	Manganese	5.0	U
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	7.0	U
7440-09-7	Potassium	9780	-
7482-49-2	Selenium	14.0	F
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	50800	-
7440-28-0	Thallium	2.0	U
7440-62-2	Vanadium	10.8	-
7440-66-6	Zinc	116	-
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

Comments:

SELENIUM VALUES REPORTED AT A 10X DILUTION

FORM I - IN

7/87

JEA  
2/4/88

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U.S. EPA - CLP

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB541Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB539Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Received: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	23.0	3
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	4.4	T
7440-39-3	Barium	52.6	T
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	7.2	-
7440-70-2	Calcium	109000	-
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	10.4	T
7439-89-6	Iron	31.0	U
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	52400	-
7439-96-5	Manganese	5.0	U
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	7.1	T
7440-09-7	Potassium	4830	T
7482-49-2	Selenium	2.2	T
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	16200	-
7440-28-0	Thallium	2.0	U
7440-62-2	Vanadium	10.8	T
7440-66-6	Zinc	13.8	T
	Cyanide	-	-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture:  
Artifacts: \_\_\_\_\_

Comments:

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FORM I - IN

7/87

JEM  
2/4/88

000005

U.S. EPA - CLP

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB542Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB539Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	20.0	U
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	4.0	U
7440-39-3	Barium	53.4	J
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	6.1	-
7440-70-2	Calcium	109000	-
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	10.4	J
7439-89-6	Iron	31.0	U
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	52600	-
7439-96-5	Manganese	5.0	U
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	7.0	U
7440-09-7	Potassium	4740	J
7482-49-2	Selenium	10.0	U
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	15300	-
7440-28-0	Thallium	2.0	U
7440-62-2	Vanadium	10.7	J
7440-66-6	Zinc	26.9	-
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

## Comments:

SELENIUM VALUES REPORTED AT A 10X DILUTION

FORM I - IN

7/87

JEN  
2/4/88

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476MJB544Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB539Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	20.0	U
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	4.0	U
7440-39-3	Barium	64.0	U
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	9.8	-
7440-70-2	Calcium	109000	U
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	31.0	U
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	49600	U
7439-96-5	Manganese	5.0	U
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	7.0	U
7440-09-7	Potassium	4830	U
7482-49-2	Selenium	6.9	U
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	22900	U
7440-28-0	Thallium	2.0	U
7440-62-2	Vanadium	37.3	U
7440-66-6	Zinc	20.2	-
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

Comments:

SELENIUM VALUES DETERMINED BY MSAJSH  
2/4/88

U.S. EPA - CLP

000007

EPA SAMPLE NO.

1  
INORGANIC ANALYSIS DATA SHEETLab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476MJB545Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB539Matrix (soil/water): WATER Lab Sample ID: \_\_\_\_\_Level (low/med): LOW Date Received: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	33.6	7
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	4.0	U
7440-39-3	Barium	63.8	7
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	5.0	U
7440-70-2	Calcium	104000	U
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	31.0	U
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	42200	U
7439-96-5	Manganese	5.0	U
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	7.0	U
7440-09-7	Potassium	2700	7
7482-49-2	Selenium	1.0	U
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	8380	U
7440-28-0	Thallium	2.0	U
7440-62-2	Vanadium	2.1	3
7440-66-6	Zinc	13.0	U
	Cyanide	-	-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

Comments:

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FORM I - IN

JEA  
2/4/88

7/87

000008

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB546Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB539Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Received: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	20.0	U
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	4.0	U
7440-39-3	Barium	64.4	U
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	5.0	U
7440-70-2	Calcium	105000	U
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	31.0	U
7439-92-1	Lead	4.0	U
7439-95-4	Magnesium	42700	U
7439-96-5	Manganese	5.0	U
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	7.0	U
7440-09-7	Potassium	3080	U
7482-49-2	Selenium	10.0	U
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	8530	U
7440-28-0	Thallium	2.0	U
7440-62-2	Vanadium	2.0	U
7440-66-6	Zinc	16.6	U
	Cyanide	-	-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

## Comments:

SELENIUM VALUES REPORTED AT A 10X DILUTIONJEN/H  
2/4/88

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1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB547Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB539Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Received: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	29.2	3
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	5.3	3
7440-39-3	Barium	48.8	1
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	6.6	-
7440-70-2	Calcium	45700	-
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	7.3	1
7440-50-8	Copper	9.0	U
7439-89-6	Iron	56.4	3
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	168000	-
7439-96-5	Manganese	1320	F
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	18.0	1
7440-09-7	Potassium	17600	-
7482-49-2	Selenium	1.9	3
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	90800	-
7440-28-0	Thallium	20.0	U
7440-62-2	Vanadium	3.0	3
7440-66-6	Zinc	26.6	-
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

## Comments:

THALLIUM VALUES REPORTED AT A 10X DILUTIONjef  
2/4/88

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB548Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB539Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Received: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	22.1	U
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	6.2	U
7440-39-3	Barium	49.5	U
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	5.0	U
7440-70-2	Calcium	45500	U
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	7.8	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	140	U
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	171000	U
7439-96-5	Manganese	1330	F
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	20.7	U
7440-09-7	Potassium	17700	U
7482-49-2	Selenium	2.3	U
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	91600	U
7440-28-0	Thallium	20.0	U
7440-62-2	Vanadium	2.9	U
7440-66-6	Zinc	25.1	U
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

## Comments:

THALLIUM VALUES REPORTED AT A 10X DILUTIONJEN  
2/4/88

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U.S. EPA - CLP

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB549Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB539Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	33.9	J
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	4.3	J
7440-39-3	Barium	31.8	J
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	57.3	F
7440-70-2	Calcium	95300	
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	31.0	U
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	74500	
7439-96-5	Manganese	26.6	
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	36.4	J
7440-09-7	Potassium	17900	
7482-49-2	Selenium	550	J
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	82200	
7440-28-0	Thallium	20.0	U
7440-62-2	Vanadium	22.6	J
7440-66-6	Zinc	608	
	Cyanide		

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

Comments:

SELENIUM AND THALLIUM VALUES REPORTED AT A 10X DILUTION

FORM I - IN

7/87

JSH  
2/4/88

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1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB550Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB539Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	30.5	U
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	5.2	U
7440-39-3	Barium	30.5	U
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	57.2	F
7440-70-2	Calcium	93700	-
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	31.0	U
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	73900	-
7439-96-5	Manganese	26.3	-
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	34.4	K
7440-09-7	Potassium	19800	-
7482-49-2	Selenium	686	F
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	84800	-
7440-28-0	Thallium	2.0	U
7440-62-2	Vanadium	23.7	I
7440-66-6	Zinc	594	-
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

## Comments:

SELENIUM VALUES REPORTED AT A 10X DILUTION

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476MJB551Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB539Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	50.9	F
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	7.0	S
7440-39-3	Barium	33.2	T
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	41.1 F	-
7440-70-2	Calcium	160000	-
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	31.0	U
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	105000	-
7439-96-5	Manganese	1330 F	-
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	76.2	U
7440-09-7	Potassium	75300	-
7482-49-2	Selenium	189 F	I
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	135000	U
7440-28-0	Thallium	20.0	U
7440-62-2	Vanadium	4.7	I
7440-66-6	Zinc	132	-
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

## Comments:

SELENIUM VALUE DETERMINED BY MSA  
SELENIUM VALUES REPORTED AT A 2X DILUTION  
THALLIUM VALUES REPORTED AT A 10X DILUTION

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U.S. EPA - CLP

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB552Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB539Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	57.8	J
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	9.9	J
7440-39-3	Barium	32.5	J
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	35.6 F	-
7440-70-2	Calcium	157000	-
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	31.0	U
7439-92-1	Lead	10.0	U
7439-95-4	Magnesium	102000	-
7439-96-5	Manganese	1300 F	-
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	72.8	-
7440-09-7	Potassium	73600	-
7482-49-2	Selenium	161 F	J
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	133000	-
7440-28-0	Thallium	20.0	U
7440-62-2	Vanadium	5.3	J
7440-66-6	Zinc	134	-
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

## Comments:

ARSENIC AND SELENIUM VALUES DETERMINED BY MSA  
SELENIUM, THALLIUM AND LEAD VALUES REPORTED AT A 10X DILUTION

FORM I - IN

JEM  
2/4/88

7/87

## INORGANIC ANALYSIS DATA SHEET

MJB553

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB539Matrix (soil/water): WATER Lab Sample ID: \_\_\_\_\_Level (low/med): LOW Date Received: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	1260	-
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	24.9	-
7440-39-3	Barium	44.9	J
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	781 F	-
7440-70-2	Calcium	133000	-
7440-47-3	Chromium	34.0	-
7440-48-4	Cobalt	8.6	J
7440-50-8	Copper	9.0	U
7439-89-6	Iron	1130 F	-
7439-92-1	Lead	11.8	J
7439-95-4	Magnesium	73000	-
7439-96-5	Manganese	2180 F	-
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	246	-
7440-09-7	Potassium	74100	-
7482-49-2	Selenium	291 F	J
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	85800	-
7440-28-0	Thallium	20.0	U
7440-62-2	Vanadium	153	-
7440-66-6	Zinc	6160 F	-
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

## Comments:

ARSENIC AND LEAD VALUES DETERMINED BY MSA  
SELENIUM VALUES REPORTED AT A 2X DILUTION  
THALLIUM VALUES REPORTED AT A 10X DILUTION

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U.S. EPA - CLP

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB554Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB539Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Received: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	1210	-
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	30.8	-
7440-39-3	Barium	45.2	X
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	782 F	-
7440-70-2	Calcium	132000	-
7440-47-3	Chromium	25.8	-
7440-48-4	Cobalt	7.0	U
7440-50-8	Copper	9.9	X
7439-89-6	Iron	979 F	-
7439-92-1	Lead	12.0	I
7439-95-4	Magnesium	72500	-
7439-96-5	Manganese	2170 F	-
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	245	-
7440-09-7	Potassium	72300	-
7482-49-2	Selenium	181 F	I
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	84600	-
7440-28-0	Thallium	2.3	X
7440-62-2	Vanadium	148	-
7440-66-6	Zinc	6130 F	-
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

## Comments:

ARSENIC AND LEAD VALUES DETERMINED BY MSA  
SELENIUM VALUES REPORTED AT A 10X DILUTION

FORM I - IN

JEP/J  
2/4/88

7/87

U.S. EPA - CLP

000017

EPA SAMPLE NO.

1  
INORGANIC ANALYSIS DATA SHEETLab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476MJB555Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB539Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	9990	-
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	11.8	-
7440-39-3	Barium	163	U
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	5.0	U
7440-70-2	Calcium	131000	-
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	10.2	U
7440-50-8	Copper	21.8	U
7439-89-6	Iron	23700	F
7439-92-1	Lead	10.0	U
7439-95-4	Magnesium	50800	-
7439-96-5	Manganese	324	F
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	13.3	U
7440-09-7	Potassium	5510	-
7482-49-2	Selenium	1.7	U
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	66600	-
7440-28-0	Thallium	2.0	U
7440-62-2	Vanadium	108	-
7440-66-6	Zinc	47.5	-
	Cyanide		-

Color Before: YELLOW  
Color After: BROWNClarity Before: CLOUDY  
Clarity After: CLOUDYTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

Comments:

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FORM I - IN

JEA  
2/4/88

7/87

U.S. EPA - CLP

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1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB556Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB539Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	77.7	U
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	4.0	U
7440-39-3	Barium	86.7	U
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	8.2	-
7440-70-2	Calcium	121000	U
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	128	U
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	46500	U
7439-96-5	Manganese	12.8	U
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	7.0	U
7440-09-7	Potassium	4980	U
7482-49-2	Selenium	1.0	U
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	66000	U
7440-28-0	Thallium	20.0	U
7440-62-2	Vanadium	52.8	-
7440-66-6	Zinc	39.5	-
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

## Comments:

THALLIUM VALUES REPORTED AT A 10X DILUTION

FORM I - IN

JEM  
24/18

7/87

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB557Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB539Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	47.8	3
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	4.7	3
7440-39-3	Barium	25.1	1
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	10.0	F
7440-70-2	Calcium	100000	-
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	31.0	U
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	99200	3
7439-96-5	Manganese	8.8	3
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	25.4	1
7440-09-7	Potassium	21300	1
7482-49-2	Selenium	775	F
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	66500	-
7440-28-0	Thallium	20.0	U
7440-62-2	Vanadium	14.2	1
7440-66-6	Zinc	199	-
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

## Comments:

SELENIUM AND THALLIUM VALUES REPORTED AT A 10X DILUTION

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U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJB558Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-01-7476Lab Code: ENSECO Case No.: 8383 SAS No.: \_\_\_\_\_ SDG No.: MJB539Matrix (soil/water): WATER

Lab Sample ID: \_\_\_\_\_

Level (low/med): LOWDate Recieved: 11/06/87% Solids: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C
7429-90-5	Aluminum	49.2	3
7440-36-0	Antimony	31.0	U
7440-38-2	Arsenic	5.8	4
7440-39-3	Barium	24.5	3
7440-41-7	Beryllium	1.0	U
7440-43-9	Cadmium	8.3	-
7440-70-2	Calcium	98500	U
7440-47-3	Chromium	5.0	U
7440-48-4	Cobalt	6.0	U
7440-50-8	Copper	9.0	U
7439-89-6	Iron	31.0	U
7439-92-1	Lead	1.0	U
7439-95-4	Magnesium	102000	U
7439-96-5	Manganese	5.2	4
7439-97-6	Mercury	0.2	U
7440-02-0	Nickel	20.7	1
7440-09-7	Potassium	20600	U
7482-49-2	Selenium	890	F
7440-22-4	Silver	5.0	U
7440-23-5	Sodium	64800	U
7440-28-0	Thallium	20.0	U
7440-62-2	Vanadium	13.5	2
7440-66-6	Zinc	178	-
	Cyanide		-

Color Before: COLORLESS  
Color After: COLORLESSClarity Before: CLEAR  
Clarity After: CLEARTexture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

Comments:

SELENIUM AND THALLIUM VALUES REPORTED AT A 10X DILUTION

FORM I - IN

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